



*The Multilateral Initiative on Malaria (MIM) is an alliance of organisations & individuals concerned with malaria. It aims to maximise the impact of scientific research against malaria in Africa, through promoting capacity building & facilitating global collaboration & coordination.*

## Issue 4, March 1999

Welcome to the Fourth issue of the MIM Newsletter. As you are all aware, the malaria event of the year, the MIM African Malaria Conference takes place this month in Durban. We are looking forward to seeing over 700 malaria researchers and control personnel at the Conference. Through the generosity of the MIM funding partners and commercial sponsors, over 300 African delegates have been sponsored to attend the Conference, an indicator of the tremendous interest and enthusiasm which has been generated by the Multilateral Initiative on Malaria. A big thankyou to everyone who has worked so hard to make the MIM Conference a reality!

One of the focus areas of the MIM Conference is the Economics of Malaria, and this Newsletter contains an article by Professor Anne Mills and Catherine Goodman of the London School of Hygiene and Tropical Medicine on this subject. Marlies Craig of the South African Medical Research Council, who will be giving a plenary presentation at the Conference, has contributed an article on the MARA/ARMA network which has received funding through the MIM/TDR awards. Professor Søren Jepson provides us with some details on the European Malaria Vaccine Initiative (EMVI). Finally, Professor Ayoade Oduola announces the establishment of the African Malaria Society.

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### MIM African Malaria Conference

**14<sup>th</sup>-19<sup>th</sup> March 1999, ICC, Durban, South Africa**

The interest shown by the malaria community in the MIM conference has been remarkable. By the end of February there were over 700 registrations from 54 different countries, including 33 African countries. Over 150 abstracts have been accepted for presentations as talks, with a further 250 poster presentations. The enthusiasm shown by delegates has been matched by that of international sponsors from both the public and private sectors, who have contributed most generously to cover the costs of the Conference. Finally, the considerable time and effort expended by the Steering Committee, session co-ordinators and the Organising Committee has been outstanding and has been greatly appreciated.

### Conference Objectives and format

The MIM Conference provides a forum for researchers, health professionals and control programme personnel to meet together to discuss current activities and future action on malaria in Africa. The Conference will be an opportunity to raise awareness in the malaria community of ongoing research activities and key results, particularly from studies in Africa. As for all scientific meetings, the Conference is also intended to encourage collaborations and communication links. A particular theme of the Multilateral Initiative on Malaria is to strengthen scientific partnerships both across Africa and between Africa and the rest of the world - this being an important mechanism for developing effective research capacity. But the MIM Conference also welcomes malaria control programme personnel and health professionals who face the realities of planning and implementing measures to control malaria 'on the ground'. A major difficulty recognised to be impeding progress against malaria is the lack of adequate information for planning evidence-based control programmes. Hence, the Durban Conference is intended to play a role in orientating research agendas to the needs of ongoing control activities by bringing together research and control communities to discuss mutual problems and solutions.

The Conference will combine both formal presentations and active group discussions and debates. All delegates will have an opportunity to contribute their data and experiences to discussions in order to identify key research results with implications for immediate application to control programmes, and also to highlight constraints in current control activities that reveal research needs. Posters will be another important way of presenting additional research data and information on ongoing control programme activities.

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The Conference has been structured towards capturing the key points from presentations and discussions and summarising these in plenary presentations. Summaries will focus on the following issues:

1. Key short, medium and long-term malaria research priorities across the broad spectrum of research areas, but with a particular emphasis on the research needs of malaria control programmes.
2. The implications of current research results for the treatment and control of malaria.
3. Mechanisms for strengthening constructive links, and promoting flow of information, amongst the control and research communities, to facilitate more coherent, effective action against malaria.
4. Identified research capacity needs (human resources) to address prioritised research.

A full Conference report will also be prepared that will capture in greater depth the discussions and presentations during breakaway and plenary sessions. The report is intended as a resource for researchers, control programme managers and funding organisations to guide and inform the future directions of activities against malaria.

A meeting of organisations involved in malaria research will also take place at the time of the MIM Conference, at which the progress of MIM and its future directions will be discussed. We will keep you informed of the outcomes!

### Research On The Economics Of Malaria In Africa

**Anne Mills And Catherine Goodman**

Health Economics and Financing Programme  
London School of Hygiene and Tropical Medicine

Concern about the economic implications of malaria has a long history, dating back to the early years of this century. For example, Christophers noted in 1911 that an epidemic in Lahore meant that 'almost the entire population was prostrated and the ordinary business of the city disrupted'<sup>1</sup>. With recent international malaria initiatives, economics has received greater attention but there is still widespread ignorance of what economics can contribute to policy on malaria control. This short contribution summarises the key research areas addressed by economics, comments on current areas of research, and identifies neglected areas that need more attention.

#### Key research areas

The main research areas to which economics can contribute can be summarised in the form of the following questions:

1. who gets malaria?
2. what determines individual and community demand for prevention and treatment?
3. what are the resource costs of malaria?
4. what should be the government's role?
5. what priority should governments give to malaria prevention and treatment?
6. which delivery strategies are most efficient and equitable? what are their financial costs?

*Who gets malaria?* While some studies in Latin America and Asia have examined this question, very few such studies have been done in Africa. Epidemiological characteristics are fairly well known, but there is very little evidence on relative risk by income level or gender, or on

whether and how individuals adapt their behaviour to influence their risk. Such data are fundamental for designing policies and strategies that will help the most needy.

*Determinants of individual and community demand for prevention and treatment* Understanding the reasons why individuals use particular health care providers is a prerequisite in seeking to improve treatment services. However, only one published study addresses the question of malaria-specific demand and the influence of various determinants including price. There is some good anthropological evidence on treatment-seeking behaviour, and recently a number of willingness to pay studies have been funded by WHO TDR. These are beginning to produce results which can feed into policies on whether or not to charge, and on fee levels. However larger scale studies are needed of individuals' actual behaviour in seeking and paying for treatment and preventive services.

*What are the resource costs of malaria?* Malaria is expected to have an economic impact through its effects on:

- labour efficiency
- child development
- land use
- expenditure on prevention and treatment by households and the public health sector.

A systematic review<sup>1</sup> has recently been conducted of the evidence on each of these<sup>ii</sup>. It concludes that existing evidence is extremely weak. Studies fail to consider household coping strategies that reduce the impact (but may also have costs); and the potentially pervasive effect of malaria on the production possibilities and incentives of households. For example, households may limit labour specialisation in order to preserve labour reserves for when illness or death occurs. A much more systematic effort is required to ensure that key differences in economic environments and malaria epidemiology are taken into account, and that thought is given not only to current costs but also to the extent to which these can be reduced by different approaches to control.

*The government's role in malaria control* Governments may finance and provide services themselves, fund services provided by others (eg by NGOs), or leave both financing and provision to others, reserving for themselves purely a regulatory role. Despite the importance of this topic, it has been little addressed by economists in relation to malaria. This is particularly surprising given the very widespread use of private sector treatment services. The attention given to mosquito nets is beginning to raise questions over the relative role of government in their financing and provision, and this examination needs to be extended to malaria control interventions more broadly.

*Relative priority of malaria prevention and treatment* Economic techniques to address questions of priorities and resource allocation include cost-benefit analysis and cost-effectiveness analysis. There are no published cost-benefit analyses for African countries, and a very limited number of usable cost-effectiveness studies. To remedy the lack of information for decision making, a modelling study has recently been completed\*, designed to make the best use of

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<sup>1</sup> Funded by the Global Forum for Health Research

available data to draw conclusions on the cost-effectiveness of key malaria control interventions<sup>iii</sup>. The central message to policy makers and programme managers from this work is that highly cost-effective interventions exist to help control malaria. These include strategies to prevent malaria in children (insecticide-treated nets, residual spraying), to protect pregnant women, and to improve case management (for example through pre-packaging drugs to increase compliance). There are many problems to be faced in putting these interventions in place and expanding their coverage, not least issues of acceptability and drug and insecticide resistance. However, effort can clearly be justified on the grounds that these interventions are very good value for money.

The analysis highlights that the most cost-effective mix of interventions will vary from place to place, depending on factors such as the level of existing infrastructure and the length of the transmission season. Similar analysis at the country level is thus needed to feed into decisions on country policy. Future field research needs to concentrate on improving the empirical evidence on the costs and effects of interventions: for example, there are no cost-effectiveness data at all on some key potential control approaches such as residual spraying, environmental management, and epidemic surveillance, and the cost-effectiveness of strengthening case management has been little explored.

*Which delivery strategies are most efficient and equitable? what are their financial costs?* These topics in the area of operational research have been grossly neglected, and were identified as priorities in the report of the Dakar meeting. There have been virtually no comparisons of the best way of delivering particular interventions such as nets and insecticides; no studies of the relative merits of public versus private delivery of interventions; and even information on the costs of various interventions is very limited. Given the limited capacity of governments to greatly extend coverage of interventions, an important priority is to understand better existing private markets and how their functioning might be improved.

### Concluding comments

The above review raises a large number of priorities for research. From a policy point of view, those that need to be addressed with greatest urgency are those that can help design delivery strategies, and guide policy on working with the private sector.

Although it is true that areas of research that concern health policy, health systems, and programme delivery have received inadequate attention from funding agencies, it is also true that capacity to do such research requires strengthening. This is particularly vital if research is to be done that is locally relevant, and can be fed regularly into the deliberations of decision makers and programme managers.

<sup>i</sup>Christophers SR (1911). Malaria in the Punjab. *Scientific memoirs by officers of the medical and sanitary departments of the Government of India*. New Series no 46.

<sup>ii</sup>Chima R, Goodman C, Mills A The Economic Impact of Malaria in Africa: a critical review of the evidence. *WHO Bull*, submitted

<sup>iii</sup>Goodman C, Coleman P, Mills A (1999) The cost-effectiveness of malaria control in sub-Saharan Africa. *Lancet* submitted.

## MARA/ARMA (Mapping Malaria Risk in Africa /Atlas du Risque de la Malaria en Afrique)

**Marlies Craig**  
National Malaria Control Programme, South African Medical Research Council

Accurate, relevant and timely information is required before control operations can be planned and resources allocated properly. Maps offer an ideal way of displaying complex information clearly and intuitively, and malaria has been mapped in several countries. Malaria and its control are increasingly seen as a continental rather than a national problem, but no atlas exists for Africa. The demand for evidence-based planning has also grown. While large volumes of malaria related data have been collected over the decades, they have hardly been used, are poorly archived and risk being lost for future use. In the face of current needs for targeted and informed intervention, existing empirical data need to be brought together in one place, organized and made accessible.

It is with these obvious needs in mind that the MARA/ARMA project was conceived<sup>1,2</sup>. A Pan-African collaborative network was established, with the aim to collect, collate, validate and manage all available empirical malaria data from sub-Saharan Africa, and to map malaria distribution, intensity and seasonality for the continent. Funds were provided by the IDRC (International Development Research Centre), the Wellcome Trust and more recently through a MIM award.

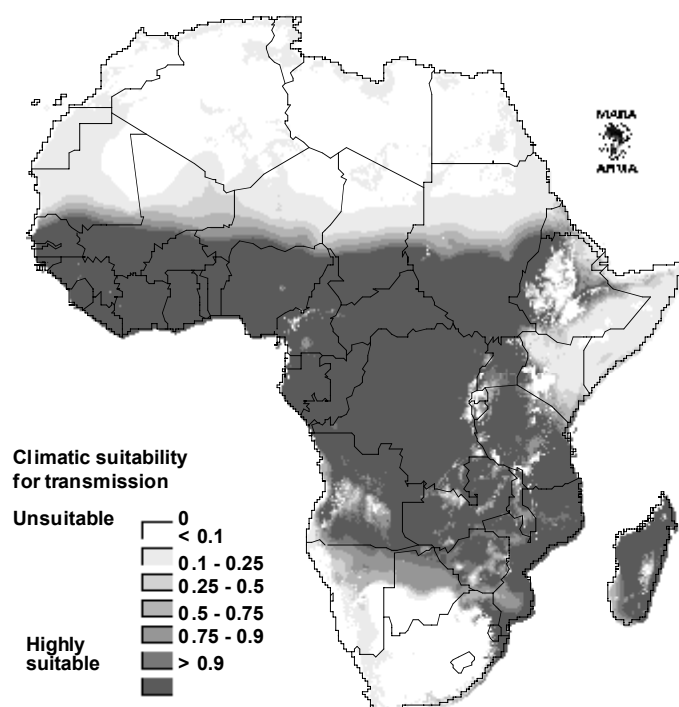
MARA/ARMA relies on two parallel and complementary approaches: an empirical data collection and geographical modelling.

For the data collection, Africa was divided into functional regions, with five regional centres and two sub-centres responsible for 5-7 countries each. The centres are located at existing institutions, each run by a data co-ordinator and a co-investigator. A proforma and a customized data-entry system standardize collection of data from many different sources, and a relational database accommodates the full complexity of all data relationships. All survey locations data are being recorded for use in a geographical information system. Published and unpublished malaria data are located through Medline and Embase searches, manual searches of libraries, universities and national and international archives, as well as through personal contact with researchers. As of mid-1998, this intensive search has yielded 2529 prevalence ratios conducted on children under 10. Additional data on vector distribution<sup>3</sup> entomological inoculation rates, drug resistance, insecticide resistance and burden of disease will be incorporated in future.

The second focus involves predictive modelling on the basis of climatic and other environmental factors, supplementing the malaria data collection where no such data exist. Questions of where (distribution), why (environmental determinants), when (seasonality) and how severely (endemicity) malaria occurs are addressed at different spatial scales. We view the modelling of malaria in Africa as a four-level approach. At the continental level, two

models have been developed, one predicting the distribution of stable malaria<sup>4</sup> (Figure), the other the duration and timing of the transmission season(s). The distribution model was used to estimate populations at risk of malaria<sup>5,6</sup>. At the second level, records of malaria epidemics in highland areas have been collected (under the Highland Malaria Project), and we are investigating inter-annual variation in climate and its relation to highland epidemics. At the national level the empirical data have been used to derive malaria endemicity models<sup>7-10</sup>. The local level is mostly beyond the scope of MARA/ARMA as a whole.

**Figure: Predicted distribution of stable malaria transmission, based on suitable temperature and rainfall.**



The final product of MARA/ARMA will be an atlas of malaria risk for the whole continent, containing country maps of endemicity, seasonality and others. The first technical report<sup>11</sup> gives an overview of MARA/ARMA activities to date. Eventually, an electronic version of the atlas, which will allow for constant updating, extracting, querying and refining, will be placed on the Internet for public use.

MARA/ARMA is running effectively, is attracting interest and funding. The network consists of individuals, not institutions, which gives MARA/ARMA flexibility and energy as the collaborators are personally motivated, and it functions more effectively as it does not depend on institutional bureaucracies. What started as a risky venture has now gained momentum and the web of partnerships continues to grow. As a result, different interest groups are starting to crystallize, which focus on specific aspects within the project. MARA/ARMA was conceived by scientists in Africa, is driven as a network of African malaria centres across the continent and its primary objective is to support African control initiatives. To this

end MARA/ARMA is a unique initiative that can serve as a model for other large-scale disease information systems in Africa and in other developing countries.

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### European Malaria Vaccine Initiative (EMVI)

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The European Commission has taken steps to further strengthen its own malaria research portfolio, and to fill some of the gaps which were identified at MIM's international launch in Dakar, Senegal in January 1997. Following discussions with members of the Concerted European Approach towards the Development of a Malaria Vaccine (VINCOMAL), and the African Malaria Vaccine

## The Multilateral Initiative on Malaria (MIM)

Testing Network (AMVTN), the European Malaria Vaccine Initiative (EMVI) has been established with European Commission and Member States' support.

European malariologists have been characteristically cautious in their approach to malaria vaccine development. Now they are convinced that the results they have obtained from pre-clinical and immuno-epidemiological studies provide a firm foundation for a move towards human trials. The time has come for a more directed vaccine development strategy. Until now, the response of many malaria vaccine researchers, when asked why their malaria vaccine candidates are still on the bench rather than in clinical trials, is that they have had problems in persuading industrial partners to make critical investments in the development of their 'pet' antigen.

Given the wide range of possible malaria vaccine candidates which have been 'on offer' to industry, it is no surprise that vaccine manufacturers have exercised caution. Vaccine development is always a risky business, and for malaria perhaps a bigger risk than for many other diseases, especially given the diversity of the organism. Where industrial partners have been engaged, they have made key contributions.

EMVI was established in 1998 by the European Commission and interested European Union Member States, in order to address identified structural deficiencies in public funded malaria vaccine development.

The aim of EMVI is to provide a mechanism through which the development of experimental malaria vaccines can be accelerated within Europe and in developing countries.

EMVI shall facilitate and contribute to the post validation phase of nationally and internationally funded malaria vaccine research and development, and will provide a mechanism to see candidate molecules through to limited GMP production and clinical trials in close collaboration with AMVTN.

Through the STD3 and INCO-DC Programmes, the EC supports pre-clinical studies of a number of malaria vaccine candidate antigens in various stages of the development process. Which, if any, of these or other potential malaria vaccine candidate antigens will receive support from EMVI will be determined in open competition. EMVI will ensure that the past investments in basic research are fully exploited.

EMVI launched its first call for Letters of Interest with deadline 5 November 1998. The fifteen letters are currently under review by EMVI's Scientific Advisory Committee.

In preparation for clinical trials, and further strengthening Europe's capacity for malaria vaccine studies, the Nijmegen group recently conducted the first controlled volunteer human *P. falciparum* infections in Europe, via bites of mosquitoes fed on *in vitro* cultivated gametocytes. Each volunteer received 4 to 6 infective bites, and all came down with microscopically detectable blood infection, 7 to 9 days later. Once successful, controlled challenges have been completed, the next phase will be field testing. For this, EMVI has established close collaboration with AMVTN, which is co-ordinated from Tanzania by Professor Wen Kilama.

EMVI is administered by the Centre for International Health, University of Bergen, Norway. Further information on EMVI may be obtained from the Manager of the EMVI secretariat

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The EMVI home page is at <http://www.emvi.org>.

## African Malaria Society (AMS) Société Africaine du Paludologie (SAP)

**Professor Ayoade Oduola**  
**Postgraduate Institute for Medical Research and Training, College of Medicine, University of Ibadan**

The centenary celebration of malariology organised by the Italian Society of Parasitology at the Institute dei Lincei, Rome, Italy witnessed the historic creation of the African Society for Malariology on November 15, 1998. The celebration attended by 23 African scientists was instrumental in the culmination of over 10 years of effort to provide an enabling and conducive umbrella for promotion of interaction and excellence among malariologists in Africa. Seventeen of the African scientists present at the inaugural meeting of the society unanimously resolved to establish a society with both English and French appellations of African Malaria Society (AMS) and Société Africaine du Paludologie (SAP) respectively.

The objectives of the society are:

- To promote research on all aspects of malaria in Africa
- To promote effective malaria control
- To train young scientists
- To promote collaboration among scientists and institutions with objectives of developing capacity on research in Africa
- To promote dissemination of scientific information on malaria in Africa.
- To promote the incorporation of research findings into control policy and plans.
- To promote the elimination of malaria by all means available.

The constitution of the Society was also inaugurated to provide a two year term for each member of the governing board renewable for an additional term of the same duration. The officers on the board of the society will include a President, 3 vice presidents (from western, eastern and southern regions of Africa), a secretary, an assistant secretary, Treasurer and 2 elected members. The constitution also provides for election of six honorary fellows to be selected from all over the world in recognition of their contributions to advancement of the effort against malaria. An annual award would also be endowed and presented to a non-African scientist who made or is making a significant contribution to understanding of malaria in Africa through research and training leading to enhanced management and control of the disease. Membership due for the Society was set at \$50.00 and \$10.00 for full and junior members respectively. The Society's membership will be open to individuals, organisations and associations interested and involved in malaria research and control.

## The Multilateral Initiative on Malaria (MIM)

The activities of the African Malaria Society will focus on activities to promote malariology in Africa. These will include:

- Organising annual conferences to bring together malariologists in Africa.
- Establish a travelling faculty to promote and support lectures at institutions.
- Organise training workshops to disseminate and transfer technology to enhance research and control activities.
- Obtain funds for fellowship awards for training of African Malariologists.
- Publish a Newsletter of the Society
- Publish peer reviewed scientific work of members and other investigators in Africa.
- Establish a web site for the society.
- Institute an endowed annual award for recognition of promotion of research on malaria in Africa.

The 1999 annual meeting of the society will be held in Durban, South Africa from March 14 to 19, 1999 during the African Malaria Conference organised by the Multilateral Initiative on Malaria (MIM). The Organising Committee of the African Malaria Conference has generously permitted the Society to present its first Annual Award for contribution to promotion of research on malaria in Africa at the Conference Dinner on Wednesday, 17th of March, 1999. Application forms for membership will also be available at the meeting.

The inaugural members of the board of the African Malaria Society (AMS) Société Africaine du Paludologie (SAP) are:

President - Professor L.A. Salako, Nigeria

Vice President 1 - Professor Yeya Touré, Mali

Vice President 2 - Dr. Brian Sharp, South Africa

Vice President 3 - \*Dr. Andrew Kitua, Tanzania

Secretary - Prof. A.M. J. Oduola, Nigeria

Assistant Secretary - \*Dr. Francine Ntoumi, Congo

Treasurer - Dr. Robert Guiguemdé, Burkina Faso

Two Elected Members:

\*Professor Wen Kilama, Tanzania

\*Dr. Same Ekobo, Cameroon

\*Absent at the meeting

The secretariat of the African Malaria Society (ASP) Société Africaine du Paludologie (SAP) is located with the Secretary:

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We endeavour to ensure that all information in the newsletter is accurate. If there is any information which is missing or inaccurate, we would like to hear from you. The Wellcome Trust, as coordinator of MIM, depends on you to provide us with information on malaria activities, so we can coordinate and disseminate this information. We welcome contributions from our MIM colleagues.

The society is also announcing a competition for African scientists to design a logo for the society. The logo should include the map of Africa and other symbols of malaria. All entries should be sent to the secretary of the Society.

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<sup>iii</sup> Goodman C, Coleman P, Mills A (1999) The cost-effectiveness of malaria control in sub-Saharan Africa. *Lancet* submitted.